Objective

By the end of the presentation, the participant should be able to:

1. Identify at least 3 high risk medications in older adults.

2. Discuss at least 2 medication safety concerns that are relevant to older adults.

3. List at least 2 ways to minimize the use of high-risk medications in older adults.

Did you know?

• 10.7% of hospital admissions in older adults are associated with adverse drug events (ADE)\(^1\)

• Approximately 100,000 emergency hospitalizations a year are due to ADEs\(^2\)
  – 48% of hospitalizations occur in adults 80 years of age or older
  – 66% were due to unintentional overdoses

Top Five Problematic Medication Classes leading to ED

1. Hematologic
2. Endocrine agents
3. Cardiovascular agents
4. Central Nervous System Agents
5. Anti-infective
Top Offending Medications
(67% of cases)

- Warfarin (33.30%)
- Insulins (13.90%)
- Oral Antiplatelet agents (13.30%)
- Oral Hypoglycemics (10.70%

“If medication related problems were ranked as a disease, it would be the fifth leading cause of death in the US!”

* Beers MH. Arch Internal Med. 2003

Types of Potentially Inappropriate Medication (PIM) Scales

- Implicit Criteria
  - Literature Review
  - Mathematical Calculation
  - Examples:
    - Medication Appropriateness Index (MAI)
    - Drug Burden Index (DBI)

- Explicit Criteria
  - Expert Opinion
  - Expert Consensus Panel
  - Examples:
    - 2012 AGS Beers criteria
    - Screening Tool of Older Persons Potentially Inappropriate meds (STOPP) criteria
    - Anticholinergic Risk Scale
    - Anticholinergic Cognitive Burden Scale

Does it matter which scale you use?

- Comparison of Beers and STOPP Criteria in Assessing Potentially Inappropriate Medications (PIMs) in Nursing Home Residents Attending the Emergency Room JAMDA Nov 2014
- Take Home Points:
  - 95.2% of the NH population were prescribed at least 1 PIM
  - Approximately 30% of the population had a probably link between attendance at ED and PIM
  - 84% of them were related to a fall or h/o fall and medications
  - Both lists were effective at identifying a vulnerable patient population who benefit from ongoing medication review

Beers Criteria: History and Utilization

- Original 1991 – Focused on nursing home patients
- Updates
  - 1997: All elderly; adopted by CMS in 1999 for nursing home regulation
  - 2003: Era of generalization to Med D, then NCQA, HEDIS
  - 2012: Further adoption into quality measures and AGS involvement
  - 2015: Pending further updates

AGS 2012 BEERS CRITERIA
CLINICAL HIGHLIGHTS & EVIDENCE
Beers Criteria Utilization

- 2003 and now 2012 AGS Beers Criteria has been utilized as a clinical tool to address:
  - Adverse Drug Events (ADEs)
  - Readmissions
  - Delirium
  - Unplanned Hospitalization

Beers Criteria- 3 Main Tables

1. Table 2: Medications or medication classes that should be avoided in persons 65 years or older

2. Table 3: Medications that should not be used in older person known to have specific medical diseases or conditions.

3. Table 4: Medications that should be used with caution

Beers Criteria: Table 2 Results

- 34 potentially inappropriate medications/classes to avoid in older adults independent of diagnoses or conditions.
- Notable mentions:
  - Sliding Scale Insulin
  - Antipsychotics for Behavioral Health issues associated with dementia
  - Non benzodiazepine Hypnotics

Beers Criteria: Overall Results

- A total of 53 medications or medication classes, which are divided into three tables.
- Constructed and organized by:
  - major therapeutic classes and
  - organ systems

Beers Criteria: Table 2 Results

- Sliding Scale Insulin
  - Higher risk of hypoglycemia without improvement in hyperglycemia management regardless of care setting.
  - Avoid
  - Moderate
  - Strong
  - Queale 1997

Important to look at during transitions in care due to the fact that PO Diabetes meds are stopped when they are admitted and typically have insulin protocols in place.
Antipsychotics

Rationale

Avoid use for behavioral problems of dementia unless non-pharmacologic options have failed and patient is threat to self or others.

Recommendation

Moderate

Quality of Evidence

Strong

Strength of Recommendation

Dore 2009
Maher 2011
Schneider 2005
Schneider 2006a
Schneider 2006b
Vigen 2011

Non Benzodiazepine Hypnotics

Rationale

Benzodiazepine-receptor agonists that have adverse events similar to those of benzodiazepines in older adults (e.g., delirium, falls, fractures); minimal improvement in sleep latency and duration.

Recommendation

Moderate

Quality of Evidence

Strong

Strength of Recommendation

Allain 2005
Cotroneo 2007
Finkle 2011
McCrae 2007
Orriols 2011
Rhalimi 2009

Psychiatric Medications Adverse Events in Older Adults

- Intent of this study: estimate the number of ADEs among US adults between Jan 1, 2009 - December 31, 2011
- Results:

<table>
<thead>
<tr>
<th>Drug Class</th>
<th># of cases</th>
<th>Estimated # of annual visits</th>
<th>Hospitalization rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedatives and anxiolytics</td>
<td>380</td>
<td>8493</td>
<td>32%</td>
</tr>
<tr>
<td>Antidepressants</td>
<td>178</td>
<td>4064</td>
<td>24.9%</td>
</tr>
<tr>
<td>Antipsychotics</td>
<td>89</td>
<td>1940</td>
<td>35%</td>
</tr>
<tr>
<td>Lithium</td>
<td>27</td>
<td>NA</td>
<td>59.7%</td>
</tr>
</tbody>
</table>

Beers Criteria 2012: Table 3 Notables

<table>
<thead>
<tr>
<th>Disease/Syndrome</th>
<th>Drug/Drug Class</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of falls or fractures</td>
<td>Anticonvulsants</td>
<td>Ability to produce ataxia, impaired psychomotor function, syncope, and additional falls; shorter-acting benzodiazepines are not safer than long-acting ones</td>
</tr>
<tr>
<td>Delirium</td>
<td>All TCAs</td>
<td>Avoid in older adults with or at high-risk of delirium because of inducing or worsening delirium in older adults; if discontinuing drugs used chronically, taper to avoid withdrawal symptoms.</td>
</tr>
</tbody>
</table>

Beers Criteria 2012: Table 3

<table>
<thead>
<tr>
<th>Disease/Syndrome</th>
<th>Drug/Drug Class</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dementia and cognitive impairment</td>
<td>Anticonvulsants</td>
<td>Avoid because of adverse CNS effects.</td>
</tr>
<tr>
<td></td>
<td>Antipsychotics</td>
<td>Avoid antipsychotics for behavioral problems of dementia unless non-pharmacologic options have failed, and patient is a threat to themselves or others.</td>
</tr>
<tr>
<td></td>
<td>Anticholinergics</td>
<td>Antipsychotics are associated with an increased risk of cerebrovascular accident (stroke) and mortality in persons with dementia.</td>
</tr>
<tr>
<td></td>
<td>Oral decongestants</td>
<td>CNS stimulant effects</td>
</tr>
</tbody>
</table>

ANTICHOLINERGIC PIM SCALES

Anticholinergic Risk Scale (ARS)
Anticholinergic Cognitive Burden Scale (ACB)
Anticholinergic PIM Scales

- **Purposes:**
  - **ARS:** to measure the peripheral and central anticholinergic effects of medications
  - **ACB:** to identify the severity of anticholinergic negative effects on cognition
- Ranks medications by anticholinergic risk on a 0 – 3 scale
- Higher score associated with high anticholinergic burden


Anticholinergic Risk Scale

<table>
<thead>
<tr>
<th>1 Point Moderate Risk</th>
<th>2 Points Strong Risk</th>
<th>3 Points Very Strong Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbidopa-levodopa</td>
<td>Amantadine</td>
<td>Atropine</td>
</tr>
<tr>
<td>Entacapone</td>
<td>Bafodine</td>
<td>Benztropine</td>
</tr>
<tr>
<td>Haloperidol</td>
<td>Cetirizine</td>
<td>Carisoprodil</td>
</tr>
<tr>
<td>Methocarbamol</td>
<td>Cinetidine</td>
<td>Other antihistamines</td>
</tr>
<tr>
<td>Metdopramide</td>
<td>Clozapine</td>
<td>Chlorpromazine</td>
</tr>
<tr>
<td>Mirtazapine</td>
<td>Clazapine</td>
<td>Dicyclomine</td>
</tr>
<tr>
<td>Paroxetine</td>
<td>Desipramine</td>
<td>Diphenhydramine</td>
</tr>
<tr>
<td>Quetiapine</td>
<td>Loperamide</td>
<td>Fluphenazine</td>
</tr>
<tr>
<td>Ranitidine</td>
<td>Lorastidine</td>
<td>Hyoscyamine</td>
</tr>
<tr>
<td>Risperidone</td>
<td>Nortriptyline</td>
<td>Oxybutynin</td>
</tr>
<tr>
<td>Selegline</td>
<td>Olanzapine</td>
<td>Promethazine</td>
</tr>
<tr>
<td>Trazodone</td>
<td>Promethazine</td>
<td>Tertiary TCAs</td>
</tr>
<tr>
<td>Ziprasidone</td>
<td>Toleridine</td>
<td>Tizanidine</td>
</tr>
</tbody>
</table>

* Non-inclusive list


Anticholinergic Cognitive Burden Scale

<table>
<thead>
<tr>
<th>1 Point Possible Effect</th>
<th>2 Points Definite Effect (low)</th>
<th>3 Points Definite Effect (high)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atenolol/Metoprolol</td>
<td>Amantadine</td>
<td>Antihistamines</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>Belladonna alkaloids</td>
<td>Benztropine</td>
</tr>
<tr>
<td>Bupropion</td>
<td>Carbamazepine</td>
<td>Chlorpromazine</td>
</tr>
<tr>
<td>Chlorothalidone</td>
<td>Cyclazapine</td>
<td>Clozapine</td>
</tr>
<tr>
<td>Codiene</td>
<td>Cyproheptadine</td>
<td>Hyoscyamine</td>
</tr>
<tr>
<td>Digoxin</td>
<td>Diazepam</td>
<td>Olanzapine</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>Doxepine</td>
<td>Paroxetine</td>
</tr>
<tr>
<td>H2RAs</td>
<td>Fluphenazine</td>
<td>Promethazine</td>
</tr>
<tr>
<td>Prednisone</td>
<td>Hyoscyamine</td>
<td>Quetiapine</td>
</tr>
<tr>
<td>Risperidone</td>
<td>Meprobamate</td>
<td>Scopolamine</td>
</tr>
<tr>
<td>Theophylline</td>
<td>Nortriptyline</td>
<td>TCAs</td>
</tr>
<tr>
<td>Trazodone</td>
<td>Oxcarbazepine</td>
<td>Urinary antimuscarinics</td>
</tr>
<tr>
<td>Warfarin</td>
<td>Pimozide</td>
<td></td>
</tr>
</tbody>
</table>

* Non-inclusive list


Which of the following medications are moderately-highly anticholinergic?

A. Benztropine  
B. Oxybutynin  
C. Olanzapine  
D. Amitriptyline  
E. All of the Above

Anticholinergic Burden and Impact Systematic Review 2014 Findings

<table>
<thead>
<tr>
<th>Impact</th>
<th># of trials</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Function</td>
<td>23</td>
<td>Noted significant decline in cognitive ability (typically used MMSE)</td>
</tr>
<tr>
<td>Delirium</td>
<td>5</td>
<td>Only 3/5 trials noted a significant association with delirium and anticholinergic medications</td>
</tr>
<tr>
<td>Physical Function</td>
<td>8</td>
<td>Five of the 8 trials noted a reduced physical function in patients who took anticholinergic medications</td>
</tr>
<tr>
<td>Mortality</td>
<td>9</td>
<td>Inconclusive findings</td>
</tr>
</tbody>
</table>


How can we TACKLE the Problem?
Beers Criteria only Part of Quality Prescribing

Quality prescribing includes:
- Correct drug for correct diagnosis
- Appropriate dose (label; dose adjustments for co-morbidities, drug-drug interactions)
- Avoiding underuse of potentially important medications (e.g., bisphosphonates for osteoporosis)
- Avoiding overuse (e.g., antibiotics)
- Avoiding potentially inappropriate drugs
- Avoiding withdrawal effects with discontinuation
- Consideration of cost

Megesterol Acetate

- Brand (Generic): Megace (Megestrol acetate) 40mg/ml Oral Suspension; Megace ES 125mg/ml Oral Suspension
- Category: Antineoplastic/Immunosuppressant Agent; FDA Approval as Appetite Stimulant: Oral Susp/Soln Only
- Use: Suspension Only Approved for tx of anorexia, cachexia or unexplained significant weight loss (>5% in 1 mo; >7.5% in 3 mos; >10% in 6 mos). Unlabeled Use: Appetite stimulation w cachexia.
- Usual Dose: Weight Loss, Anorexia associated with AIDS: 400-800 mg daily in divided doses.
- Duration: D/C after 12 wks if desired wt achieved OR if wt gain of at least 4 lbs has not been achieved.
- Side Effects: DVT, thromboembolic, adrenal suppression, peripheral edema, hyperglycemia and hypertension
- Geriatric Use: Not recommended for use in bed bound residents due to DVT risk.
- Cost Comparison: Megestrol Acetate 40mg/ml: $3.39/dose; Megace ES 125mg/ml: $21.21/dose

Resources

- Advancing Excellence Campaign:
  - Available at: http://www.nhqualitycampaign.org/star_index.aspx?controls=Medications/Improves
- American Healthcare Association:
- Alzheimer’s Society

Examples of Care Initiatives

- Interdisciplinary team discussions (e.g. dietary/pharmacist/prescriber)
- Quantity/Duration Limits
- Prior Authorization for >12 weeks use

Antipsychotics and Nursing Homes

- “Today, Centers for Medicare & Medicaid Services (CMS) Acting Administrator Marilyn Tavenner announced the Partnership to Improve Dementia Care, an initiative to ensure appropriate care and use of antipsychotic medications for nursing home patients. This partnership – among federal and state partners, nursing homes and other providers, advocacy groups and caregivers – has set a national goal of reducing use of antipsychotic drugs in nursing home residents by 15 percent by the end of 2012.” (6/9/12)

Optimizing treatment and care for people with behavioural and psychological symptoms of dementia

A best practice guide for health and social care professionals


To access the reference list that supports the recommendations, go to: http://www.alzheimers.org.uk/site/scripts/documents_info.php?documentID=1675
Pharmacy Quality Alliance HRMs Measure

• High Risk Medications (HRMs)
  – Based on medication list from the updated AGS 2012 Beer’s Criteria
  – 65 years or older with two or more fills for a HRM
  – Bonus Measure
  – Weight 3

HRM Examples

<table>
<thead>
<tr>
<th>Description</th>
<th>Prescription</th>
</tr>
</thead>
</table>
| Anticholinergic | • Brompheniramine  
                  • Carbinoxamine  
                  • Chlorpheniramine  
                  • Clemastine  
                  • Cyproheptadine  
                  • Deschlorpheniramine |
| Anticholinergics (excludes TCAs), anti-Parkinson agents | • Benztropine (oral)  
                                                          • Trihexyphenidyl |
| Central nervous system, tertiary TCAs | • Amitriptyline  
                                          • Clomipramine  
                                          • Imipramine  
                                          • Trimipramine |
| Central nervous system, barbiturates | • Amberol  
                                         • Butabarbital  
                                         • Mephobarbital  
                                         • Phenobarbital  
                                         • Secobarbital |
| Central nervous system, other | • Chloral hydrate  
                                 • Meprobamate  
                                 • Thioridazine |
| Endocrine system, estrogens with or without progestins: include only oral and topical patch products | • Conjugated estrogen  
                                            • Esterified estrogen  
                                            • Estradiol  
                                            • Estropipate |
| Endocrine system, sulfonylureas, long-duration | • Chlorpropamide  
                                           • Glyburide |
| Endocrine system, other | • Desiccated thyroid  
                          • Megestrol |
| Gastrointestinal system, other | • Trimebuten |
| Pain medications, skeletal muscle relaxants | • Carisoprodol  
                                             • Chlorzoxazone  
                                             • Cyclobenzaprine  
                                             • Metaxalone  
                                             • Methocarbamol  
                                             • Orphenadrine |

HRM Examples (cont.)

Medicare Plan Finder

• Attract new beneficiaries
  – CMS highlights contracts which receive an overall rating of 5 Stars with this icon
  – Plans with fewer than 3 stars cannot enroll through medicare.gov website and receive this icon

• Retain current beneficiaries
  – Beneficiaries can switch into a 5 star program at any time regardless of the enrollment period

Star Ratings Program: Bonus Payments

Starting with MA-PD plans
  – 5 Star plans will receive a 5% bonus
  – 3 Star plans or higher will be ‘pro-rated’
    – For example, 3.5 star plan receives a 3.5% bonus
    – Bottom line estimate
  – Improving from 3 Star to 5 Star could mean a $16 ppm bonus, meaning for a plan with 1 million members = $200 million
  – Challenge: Average 2011 Star Rating = 3.47
  – After 2014, only 4 and 5 Star plans will receive any bonus

Bonus Payment Example, 2012
Clinical Connections

- High risk medications such as those identified on the 2012 AGS Beers Criteria need to be
  - Evaluated in terms of risk/benefit
  - Documented accordingly
  - Discussed with patients and/or families due to increase awareness of safety and costs.

Take Home Points

- Polypharmacy, medication misadventures as well as safety concerns continue to be a growing problem for older adults.
- We all must be vigilant to monitor patients on an ongoing basis to minimize negative outcomes.
- Explicit Criteria such as the Beers List helps with this public awareness.

Questions ???

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Email: scallinan@rx.umaryland.edu